

FLEXIBLE WRIST FOR SURGICAL TOOL

ABSTRACT OF THE DISCLOSURE

The present invention is directed to a tool having a wrist mechanism that provides pitch and yaw rotation in such a way that the tool has no singularity in roll, pitch, and yaw. In one embodiment, a minimally invasive surgical instrument comprises an elongate shaft having a working end, a proximal end, and a shaft axis between the working end and the proximal end; and an end effector. A wrist member has a flexible tube including an axis extending through an interior surrounded by a wall. The wall of the flexible tube includes a plurality of lumens oriented generally parallel to the axis of the flexible tube. The wrist member has a proximal portion connected to the working end of the elongate shaft and a distal portion connected to the end effector. A plurality of actuation cables have distal portions connected to the end effector and extend from the distal portion through the lumens of the wall of the wrist member toward the elongate shaft to proximal portions which are actuatable to bend the wrist member in pitch rotation and yaw rotation.

23281090 v1

λ